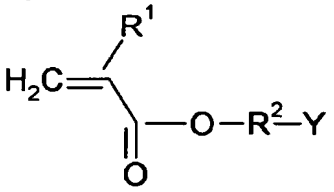
2001-235097/24 A14 D22 E14 F06 H01 J01 (A84 A96 D13 D15 D16 D21 F09) CREA- 1999.08.27
CREAVIS GES TECHNOLOGIE & INNOVATION MBH *WO 200116193-A1
1999.11.20 1999-1055992(+1999DE-1040697) *(2001.03.08)* C08F 20/34, A01N 33/12

Intrinsically anti-microbial copolymer, used e.g. as an in situ-produced coating on medical articles, is based on acryloyloxyalkylamino compound such as 2-dimethylaminoethyl methacrylate (Ger)

C2001-070460 N(AU BR CA CN IL JP KR NO NZ PL RU US) R(AT BE CH DE ES FI FR GB IE IT NL PT SE)
Addnl. Data: OTTERSBACH P, KOSSMANN B, OLES M
2000.07.17 2000WO-EP06812, 1999.10.29 1999DE-1052221, 1999.11.20 1999DE-1055992

A(4-D, 4-D9, 8-M2, 12-B1 3C1) D(9-A1) E(10-A22A, 10-A22D, 10-B2B, 10-B2E, 10-D3D, 10-G2H2) F(3-C2B, 5-B1) G(2-A3B, 2-A5G) H(1-E) J(1-X)

An antimicrobial copolymer is made by copolymerization of (A) an acryloyloxyalkylamino compound of formula (I) with (B) an aliphatic unsaturated monomer.



(I)

R^1 = H or Me;
R^2 = 1-5C hydrocarbon group;
Y = NR^3R^4 or $NR^3R^4R^5X^-$;
R^3-R^5 = optionally substituted aliphatic or aromatic 1-50C hydrocarbon group; and
X = $(CH_3SO_4)^-$, $(NO_3)^-$, F^-, Cl^-, Br^-, I^-, $(CH_3CH_2)^-$, $(NO_2)^-$, NO^-, CN^-, SCN^-, CNO^-, ClO^-, $(ClO_2)^-$, $(ClO_3)^-$ or $(ClO_4)^-$.

NOVELTY

An antimicrobial copolymer is made by copolymerization of an acryloyloxyalkylamino compound with an aliphatic unsaturated monomer.

DETAILED DESCRIPTION

USE

The copolymer is used (i) in production of (preferably medical or hygiene) articles with a antimicrobial coating of the copolymer; or (ii) lacquers, protective paints or coatings (claimed). A wide range of applications is listed, e.g. as or on drilling rigs, ships' bottoms, house walls, toilets, showers, swimming pools, saunas, food utensils or packaging, cosmetics, air conditioners, bioreactors, various handrails, car seats, clothes, carpets, curtains, telephone receivers, catheters or surgical instruments.

ADVANTAGE

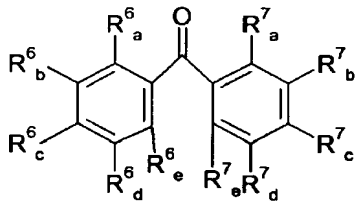
When graft polymerized on a substrate the copolymers give a durable microbiocidal coating which is non-migratory and resistant to solvents or physical forces. No further biocides need be added.

EXAMPLE

A copolymer which when tested at 0.5 g against a 20 ml solution containing *Staphylococcus aureus* showed no detectable microorganism in a 1 ml sample after 15 minutes contact with shaking was obtained by (i) heating under argon to 65°C a mixture of 2-diethylaminoethyl methacrylate (8.5 ml), Me methacrylate (3.5 ml) and EtOH (60 ml); (ii) slowly dripping in, with stirring, a solution of azobisisobutyronitrile (0.15 g) in MEK (4 ml), heating to 70°C and stirring for 72 hours; and (iii) stirring in demineralized water (0.6 l) to precipitate the polymer, filtering it off, washing it (100 ml 10% EtOH) and vacuum drying it (50°C/24 hours).

TECHNOLOGY FOCUS

Polymers - Preferred Monomers: Monomer (I) is 2-methacryloyloxyethyltrimethylammonium methosulfate, 2-(meth)acryloyloxyethyl-4-benzoylbenzyldimethylammonium bromide, 2-di(m)ethylaminoethyl (meth)acrylate or is such that one or more of R^3-R^5 = a benzophenone derivative of formula (II) where the bonding of the derivative to the N atom of (I) is via a divalent hydrocarbon group $(R^7)_{a-e}$
$(R^6)_{a-e}$ and $(R^7)_{a-e}$ = H or a mono- or di-valent 1-5C hydrocarbon group.



(II)

Monomer (B) is 2-diethylaminovinyl ether or a (meth) acrylic acid compound, especially Me-, Et-, Bu- or t.Bu-(meth)acrylate, N-3-dimethylaminopropylmethacrylamide, 3-methacryloylaminopropyltrimethylammonium chloride, 2-methacryloyloxyethyltrimethylammonium-ethosulfate or -chloride, methacrylic acid-3-dimethylaminopropylamide or methacrylic acid-2-diethylaminoethyl ester.

Preferred Preparation: Preparation is by copolymerization of (I) with (B), especially on a substrate and, in particular, as a graft polymerisation on a substrate which has been activated by UV (preferably with a photoinitiator), plasma-, corona- or flame-treatment, ozonization, electric charging or γ-irradiation.

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